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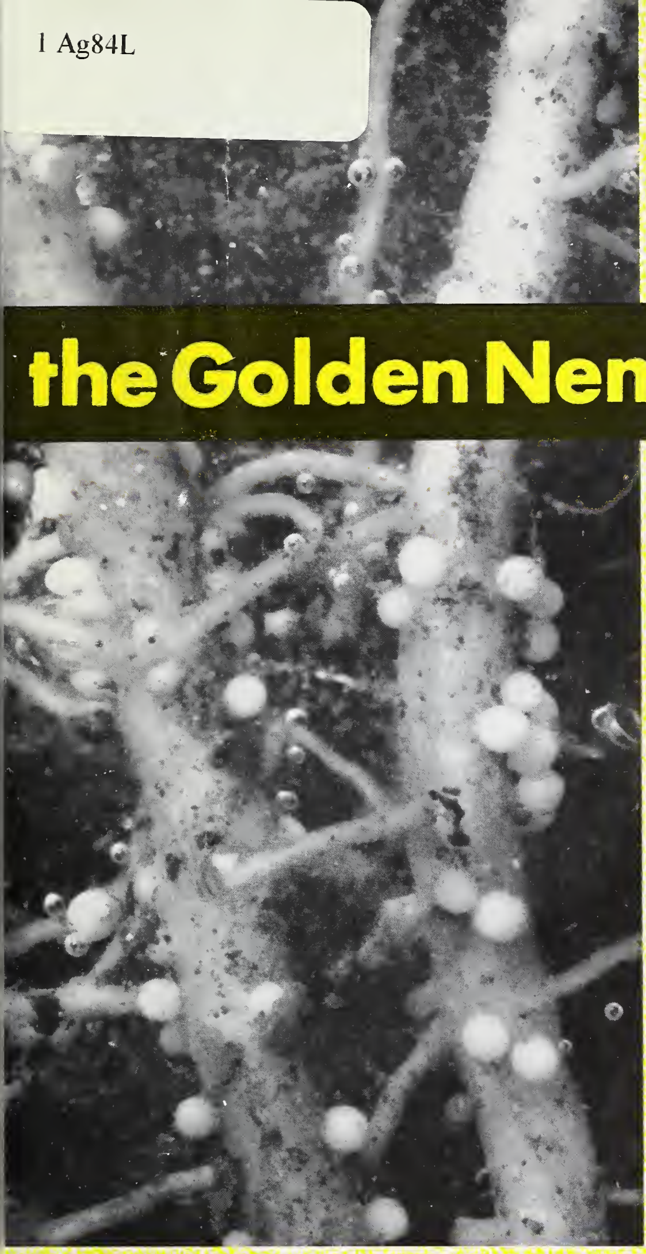

the Golden Nematode

of Potatoes and Tomatoes

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how to prevent its spread

LEAFLET No. 361
UNITED STATES DEPARTMENT OF AGRICULTURE

THE GOLDEN NEMATODE OF POTATOES AND TOMATOES

How To Prevent Its Spread

The golden nematode[1] is a minute, eel-shaped organism that attacks potato and tomato plants by working itself into the roots and feeding off the juices in the tissues. Once established in a field, it is a difficult pest to control: it can remain dormant in the soil for many years in the absence of host plants; it reproduces in large numbers.

ORIGIN AND SPREAD

Little is known of the golden nematode's origin. It was found in an isolated potato patch in Germany 70 years ago. Scientists report its presence in many countries of Europe and England. More recently it has been found in Spain, Mexico, and Peru. The only known infestation in the United States occurs in the potato-producing area on Long Island, New York.

Golden nematodes can move only a few inches each year under their own power. They are spread chiefly by man, who unknowingly transports infested soil adhering to farm machinery, burlap bags, barrels, debris, crates, and tools. They have also been found in the trouser cuffs, kneepads, pockets, and shoes of farm workers.

DAMAGE

An infestation is often not apparent until the pest has been attacking crops for several years. At first there are no above-ground evidences of plant damage. Neither potatoes nor tomatoes are disfigured to betray the golden nematode's presence.

After host crops have been repeatedly grown in an infested field, distinct above-ground signs of plant damage begin to appear. The first sign is poor top growth of plants in a small spot in the field. As the infestation grows, this spot becomes larger and additional poor-growth spots appear. Eventually poor growth is evident throughout the entire field.

Heavy infestations may cause considerable wilting of plants (especially during midday), stunting of growth, poor root development, and early plant death. In experiments on Long Island nematologists have found up to 85-percent reduction in the potato yield on heavily infested land.

DEVELOPMENT

The golden nematode passes through the egg, larval, and adult stages in its development. From 38 to 48 days are required for the egg-to-adult cycle.

The eggs hatch within the dead, swollen bodies of fertilized females, which are called cysts. Several cysts may be placed on a pinhead and each may contain up to 500 eggs. The cyst is a protective covering for the eggs and is resistant to chemicals, to drying, and to some soil organisms. Eggs may remain viable in cysts for more than 17 years.

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[1] *Heterodera rostochiensis.*

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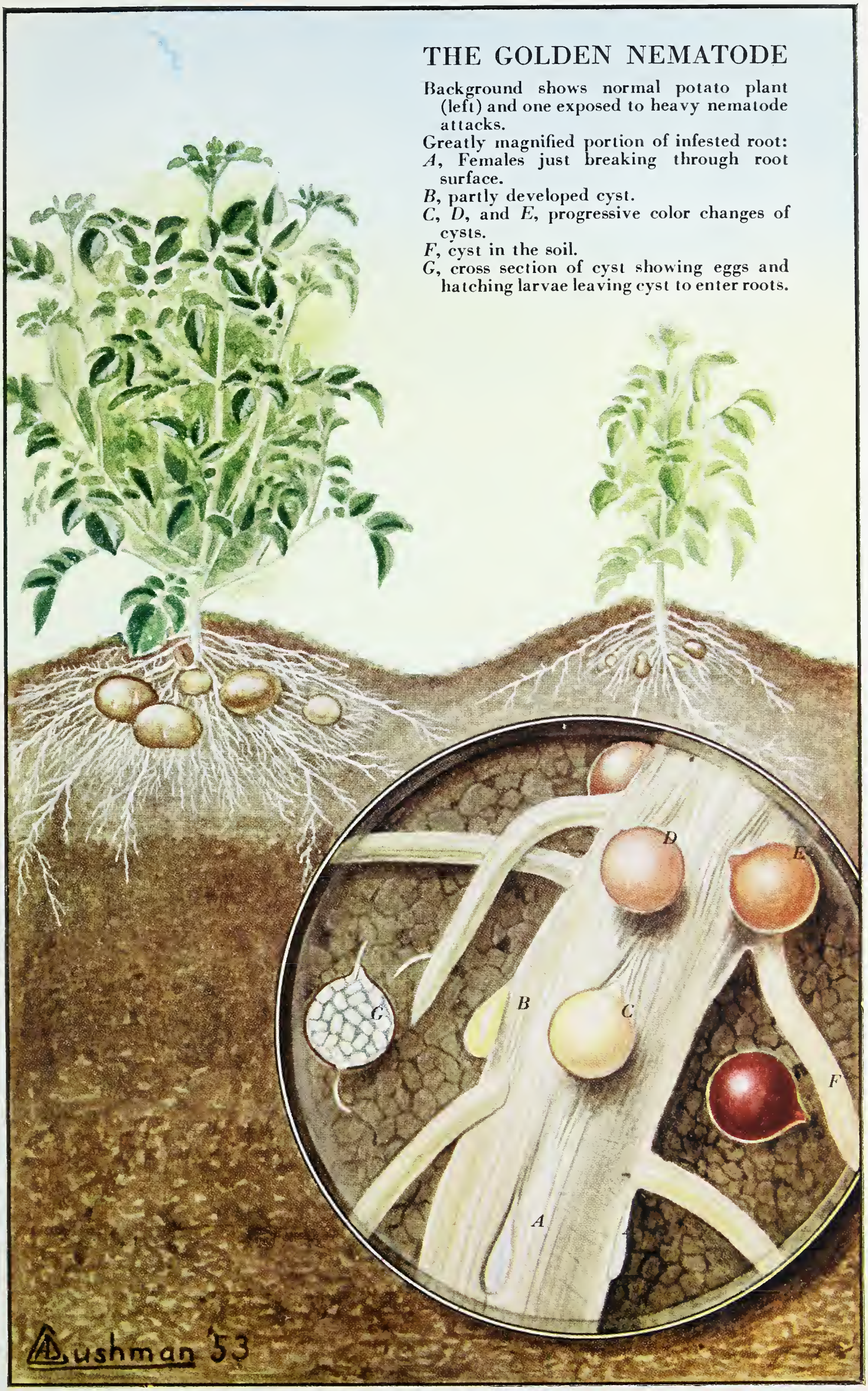

THE GOLDEN NEMATODE

Background shows normal potato plant (left) and one exposed to heavy nematode attacks.

Greatly magnified portion of infested root:
A, Females just breaking through root surface.
B, partly developed cyst.
C, *D*, and *E*, progressive color changes of cysts.
F, cyst in the soil.
G, cross section of cyst showing eggs and hatching larvae leaving cyst to enter roots.

In the spring when the soil temperature is around 60° F. a chemical given off by potato or tomato roots stimulates larvae to hatch from the eggs, leave the cyst through an opening in the wall, and migrate to host plants. Larvae enter the roots, where they feed.

In the roots, golden nematodes take up a position near the plant's vascular system and then undergo a series of changes. The females become stationary, swell, and break through the roots, to which they remain attached by a thin neck. The males retain their slender eellike form and mate with the females. After fertilization, several hundred eggs develop within the female, whereupon the female dies.

The golden nematode cyst is visible to the naked eye. At first, it is pearly white. Later, it turns golden, orange, and finally brown. (The illustrations on page 3, which are in natural color, will help you to identify the golden nematode.)

The golden nematode is so called to describe the rich golden color of the cysts that are attached to the roots.

Cysts become detached from the roots and remain in the soil after the crops have been harvested.

PREVENTING SPREAD

Control of the golden nematode is difficult and requires care, sanitation, and protection of fields. Soil fumigation and crop rotation will reduce the golden nematode population and furnish effective control.

State and Federal quarantines have been set up to prevent the golden nematode from spreading to uninfested areas. Federal quarantine inspectors are on the lookout for cysts in soil, burlap bags, and packing straw arriving in shipments from foreign countries. New York State officials in cooperation with the United States Department of Agriculture restrict the marketing of potatoes, nursery stock, topsoil, and root crops grown on infested or exposed lands.

The following practices are recommended to prevent the spread of the golden nematode to uninfested areas:

▶ Do not use secondhand containers such as burlap bags, crates, and barrels, when harvesting potatoes.

▶ Do not bring used machinery on a farm unless it has been steam-cleaned or fumigated with methyl bromide.

▶ Do not spread grader soil and debris from community graders onto farm lands.

▶ Do not grow potatoes or other host crops on infested fields.

▶ Make sure that farm workers do not innocently transport cysts in their vehicles and clothing from infested areas onto your farm.

▶ Plant only certified seed.

▶ Rotate crops on noninfested potato land but do not include tomatoes in the rotation.

This leaflet was prepared by the Plant Pest Control Division, Agricultural Research Service, Washington, D.C. — Issued May 1954

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